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ABSTRACT

One of nine brief guides for special educators on using computer technology, this guide focuses on advances in electronic aids, computers, telecommunications, and videodiscs to assist students with hearing impairments. Electronic aids include hearing aids, telephone devices for the deaf, teletypes, closed captioning systems for television, and remote signal devices. The fact that most instructional software can be used by this population with only minor modifications is noted and mention is made of various types of special instructional software to teach lip reading, signing, finger spelling, and vocalization. Word processing is recommended to improve written communication skills. The use of telecommunications is suggested to learn with and about students in distant places as well as to practice communication skills. Finally, combining videodisc technology and computer access can provide interactive instruction tailored to meet the learning needs of a student with hearing impairments. Lists of five readings, seven organizational or network resources, four periodicals, six software resources, and six hardware vendors conclude the guide. (DB)

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Center for Special Education Technology

Tech Use Guide

Using Computer Technology

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Hearing Impairments

Millions of Americans have some type of hearing impairment. These impairments may be evident at birth or may develop from illness, injury, or even long-term exposure to loud noise. Hearing loss may range from a slight insensitivity to high frequency sounds to complete deafness.

Students with hearing impairments, particularly those deaf from birth, are profoundly hampered in the way they acquire and use language. Students with hearing impairments often do not have ample opportunities to practice language naturally. As a result, these students often have poor language and reading skills, usually below that of their peers.

Technological advances may compensate for a student's hearing and enhance his or her learning experience. Advances in electronic aids, computers, telecommunications, and videodiscs are being used to assist students with hearing impairments.

Electronic Aids

A hearing aid is an assistive device used to compensate for a hearing impairment. Most of us are familiar with the standard hearing aid which is worn inside the ear. These aids amplify sounds so that they are more easily heard by the user and are suitable for persons with a slight to moderate hearing loss. For people with a more severe loss, other devices may be more appropriate.

Some persons with hearing impairments may use a system that employs a miniature FM transmitter and receiver. In these systems, a microphone is connected to a transmitter worn by the speaker — a teacher for example. The listener — a student perhaps — wears the receiver, which is connected to a hearing aid inserted in the ear. The teacher's voice is picked up by the microphone and transmitted directly to the student, thus avoiding the interference of typical classroom noise. These systems can also be used in the home to maximize training opportunities between parent and child. Systems are also being installed in public gathering places such as auditoriums or concert halls. Performances are transmitted over the system for the benefit of the persons with hearing impairments in the audience. A similar system, using infrared beams as the transmitting medium, is available for use with the home TV set.

These products, which make sound more comprehensible, are intended for use by persons who have some hearing ability. Persons who are deaf (or who have experienced severe hearing loss) can benefit from other kinds of communication devices. For example, TDDs (Telephone Devices for the Deaf) and TTYs (Teletypes) are often used by persons with hearing impairments to communicate. These devices look like small electronic typewriters and use standard telephone lines to send and receive information. The incoming and outgoing text is printed out or shown on a built-in LCD (liquid crystal display) screen. Computers equipped for telecommunications also permit their users to interact with other individuals and organizations, including various kinds of national information services such as CompuServe or The Source. These services can provide enormous communication possibilities for persons with hearing impairments.

Another familiar product is the closed captioning system used for TV broadcasting. Through these systems, the actors' lines are displayed as subtitles at the bottom of the screen. Other communication products for persons with hearing impairments include remote signal devices (e.g., a doorbell that lights a light instead of ringing a bell), and a special telephone with an LCD read-out that permits its user to receive text messages by pushing combinations of buttons on a standard touch-tone phone.

Computer Technology

Since computer technology primarily uses visual input and output modes, students with a hearing impairment can take almost full advantage of the instructional and tool software features of computer technology available to students without disabilities. A student with hearing impairments can use most instructional software with only minor modifications. Well designed computer-assisted instruction is student directed to allow the student to work at his or her own pace. Because students with hearing impairments often read below grade level, parents and teachers should look for software which allows the reading level to be changed and still maintains high interest.

Special instructional software can help to teach lip reading, signing, finger spelling, and vocalization. For example, individuals with hearing impairments often have difficulty learning to speak because they can't hear their own words to correct mispronunciations. Software that compares an individual's vocalization pattern to a model pattern may be used. When a student speaks a word, the vocalization pattern of the sound is displayed on the screen. By trying to match his or her vocalization with the

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model pattern, the student can, through successive approximations, adjust his/her vocalization pattern and acquire more natural sounding speech.

Word processing software is particularly useful for students with hearing impairments. Because of poor linguistic abilities, writing is hard work for these students. Word processing programs can be motivational. This tool software helps the student produce clear, legible documents with minimal frustrations. Spell check features permit the student to self correct errors. Also, by moving the words around, editing text, and experimenting with word combinations, the student has the opportunity to manipulate and play with language, thus increasing his or her language skills. The computer can also be used as a communication device. Speech synthesizers allow computer text to be spoken with frequently used phrases stored for easy retrieval. Students whose articulation is unclear or who have not learned to use sign language can use the computer to communicate needs.

Telecommunications

Students with hearing impairments are discovering the potential of computers to learn with and about other students hundreds and even thousands of miles away. Students from different parts of the country are using their classroom computers, equipped with a modem, to engage in a variety of joint learning and communication experiences through telecommunications. Because telecommunications requires written language, it is a natural medium to help students improve their writing and written communication skills.

A modem connected to the microcomputer permits the student to send and receive communication via the telephone. A student can access electronic mail, bulletin boards, and databases. Interface devices can be connected to the microcomputer to communicate with TDD systems.

Videodisc Technology

Videotape has been an instructional medium of choice for teaching students with hearing impairments because of its high quality visual images, ease of captioning, and capacity to present still, as well as motion, pictures. Video technology has advanced to the point that now video segments are routinely placed in videodisc format and accessed instantaneously by a computer. This combination of video images and computer access provides interactive instruction that can be tailored to meet the learning needs of a student with hearing impairments. In addition, interactive videodisc, which accesses video segments via the computer, supplies the hearing impaired student with an interactive, high quality, visual instructional medium.

Most experts agree that interested and enthusiastic teachers are an important factor in successful computer use. Used with care, computers and other instructional technology can enrich the educational environment for special needs students.

Readings

Abrams, M. (Ed.) (1987). Your computerized classroom: Using computers with hearing impaired students. Washington, DC: Gallaudet University, Pre-College Outreach Programs.

Andrews, J. F., Haas, D., & Waller, J. (1987). How to use the microcomputer with multihandicapped hearing impaired students: Teaching suggestions. Perspectives for Teachers of the Hearing Impaired, 5(3), 15-19.

Braden, J. B., & Shaw, S. R. (1987). Computer assisted instruction with the deaf: Panacea, placebo or poison. American Annals of the Deaf, 132(3), 188-193.

Storm, R. D. (1987). Computers and the writing process (an excerpt). Perspectives for Teachers of the Hearing Impaired, 6(2), 5-8.

Williams, J. M. (1988). Deaf students learn to practice speech and auditory skills using a synthesizer. Closing The Gap, 7(3), 7.

Resources

AT&T National Special Needs Center, 2001 Route 46, Suite 310, Parsippany, NJ 07054-1315, 800-233-1222 (voice).

American Speech-Language-Hearing Association, 10801 Rockville Pike, Rockville, MD 20852, 301-897-5700.

Deaftek.USA, P.O. Box 81, Fayville, MA 01745, 617-620-1777.

Deafnet, 508 Bremer Building, 7th and Roberts Streets, St. Paul, MN 55101, 612-222-6866 (voice); 612-223-5130 (TDD).

National Association of the Deaf, 814 Thayer Avenue, Silver Spring, MD 20910, 301-587-1788 (voice and TDD).

National Information Center on Deafness, Gallaudet College, 800 Florida Avenue NE, Washington, DC 20002, 202-651-5709.

Software Evaluation Clearing-house for Educators of the Hearing Impaired, Model Secondary School for the Deaf, 800 Florida Avenue, NE, Washington, DC 20002, 202-651-5333.

Periodicals

American Annals of the Deaf, P.O. Box 2605, Columbia, MD 21045.

Closing The Gap, P.O. Box 68, Henderson, MN 56044.

Perspectives for Teachers of the Hearing Impaired, Pre-College Programs, Gallaudet University, 800 Florida Avenue NE, Washington, DC 20002.

Shhh (Self Help for Hard of Hearing People), 7800 Wisconsin Avenue, Bethesda, MD 20814.

Software Resource List

Fingerspeller and Fingernumbers, Specialsoft, P.O. Box 1983, Santa Monica, CA 90406, 800-421-6534.

IBM SpeechViewer, IBM Corporation, P.O. Box 2150, Atlanta, GA 30055, 800-IBM-2133.

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IBM SpeechViewer, IBM Corporation, P.O. Box 2150, Atlanta, GA 30055, 800-IBM-2133.

Micro-Interpreter I and **II,** Microtech Consulting Company, 909 West 23rd Street, P.O. Box 521, Cedar Falls, IA 50613, 319-277-6648.

Talking Hands, EBSCO Curriculum Materials, Box 1943, Birmingham, AL 35201, 800-633-8623.

Hardware Vendors

TDD Equipment

American Communication Corporation, 180 Roberts Street, East Hartford, 06108, 203-289-3491. Manufactures telecommun. devices for the deaf.

Krown Research, Inc., 10371 West Jefferson Boulevard, Culver City, CA 90232, 213-641-4306.

Ultratec, Inc., 6442 Normandy Lane, Madison, WI 53719, 608-273-0707.

Paging Devices, FM, Infrared Systems

AT&T National Special Needs Center, 2001 Route 46, Room 310, Parsippany, NJ 07054.

Controlonics Corporation, 5 Lyberty Way, Westford, MA 01886, 617-692-3000.

Sonic Alert, Inc.,1750 West Hamlin Road, Rochester Hills, MI 48309, 313-858-8957.

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Additional **Tech Use Guides** on the following topics are available from the Center upon request:

- Guide for Teachers
- Guide for Parents
- Techology for Work, Home, and Leisure
- Computer Access
- Selecting Software
- Selecting Hardware
- Preschool Children
- Learning Disabilities
- Physical Disabilities
- Visual Impairments
- Telecommunication Networks
- Augmentation Communication

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